厦門大學

信息学院软件工程系

《计算机网络》实验报告

题　　目 实验五 CISCO IOS 路由器基本配置

班　　级 软件工程 2018 级 2 班

姓　　名 廖诗雨

学　　号 24320182203229

实验时间 2020 年 4 月 15 日

2020 年 4　月 15 日

1 实验目的

使用 Router eSIM v1.1 模拟器来模拟路由器的配置环境；使用 CCNA Network Visualizer 6.0 配置静态路由、动态路由和交换机端口的 VLAN（虚拟局域网）。

2 实验环境

Windows10 操作系统

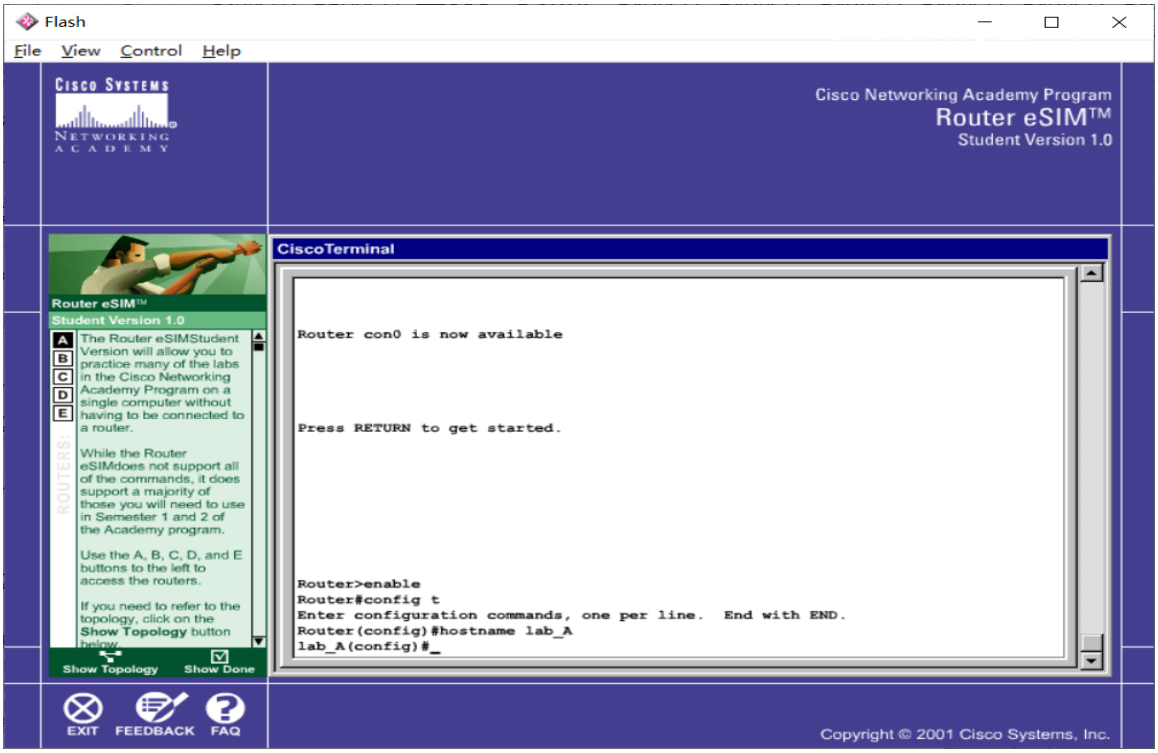
Router_eSIM_v1 模拟器

CCNA Network Visualizer 7.0

3 实验结果

1.1

给路由器取名字



设置当日消息标题

```
lab_A(config)#banner motd #
Enter TEXT message.  End with the character '#'.
```

在路由器内建立一个 IP 地址映射表

```
lab_A(config)#ip host lab_A 192.5.5.1 205.7.5.1 201.100.11.1
lab_A(config)#ip host lab_B 219.17.100.1 199.6.13.1 201.100.11.2
lab_A(config)#ip host lab_C 223.8.151.1 204.204.7.1 199.6.13.2
lab_A(config)#ip host lab_D 210.93.105.1 204.204.7.2
lab_A(config)#ip host lab_E 210.93.105.2
lab_A(config)#
```

1.2

为路由器的一个接口配置 IP 地址

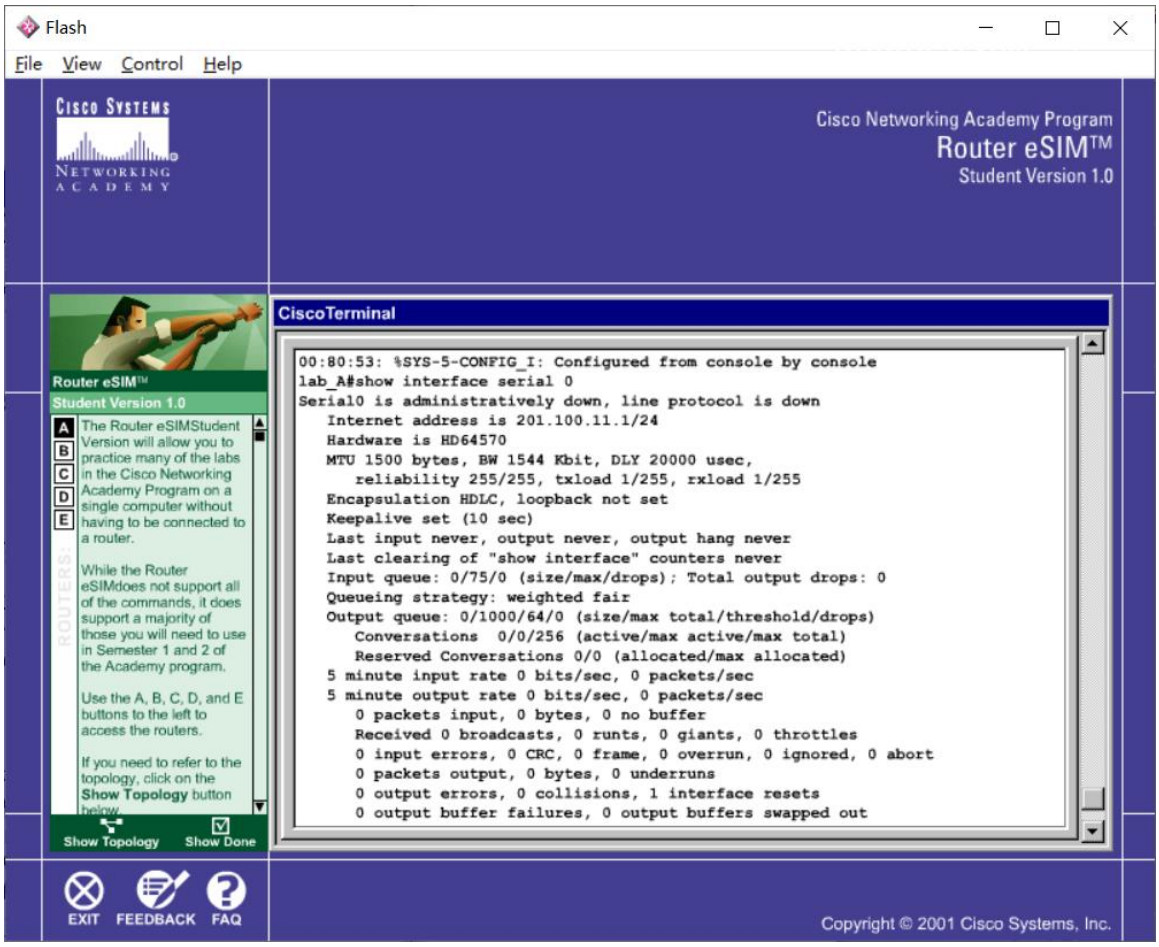
```
lab_A(config)#int eth 0
lab_A(config-if)#ip address 192.5.5.1 255.255.255.0
lab_A(config-if)#int eth 1
lab_A(config-if)#ip address 205.7.5.1 255.255.255.0
lab_A(config-if)#int serial 0
lab_A(config-if)#ip address 201.100.11.1 255.255.255.0
lab_A(config-if)#exit
lab_A(config)#
```

设置 clock rate

```
lab_A(config)#interface serial 0
lab_A(config-if)#clock rate 56000
lab_A(config-if)#_
```

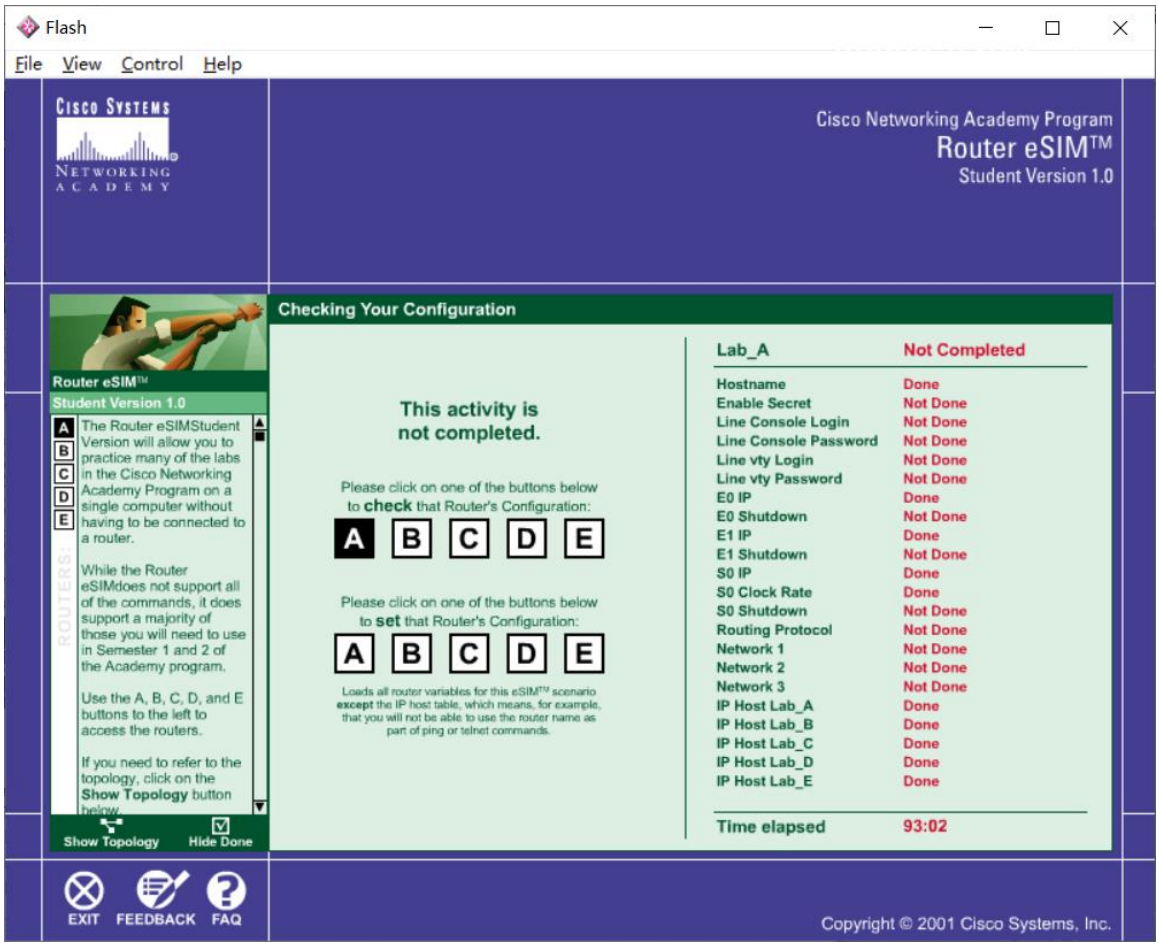
1.3

用 show 命令查看串口配置情况


Flash
File View Control Help
Cisco Systems
Networking Academy
Cisco Networking Academy Program
Router eSIM™
Student Version 1.0
Router eSIM™
Student Version 1.0
A
B
C
D
E
The Router eSIMStudent Version will allow you to practice many of the labs in the Cisco Networking Academy Program on a single computer without having to be connected to a router.
While the Router eSIMdoes not support all of the commands, it does support a majority of those you will need to use in Semester 1 and 2 of the Academy program.
Use the A, B, C, D, and E buttons to the left to access the routers.
If you need to refer to the topology, click on the Show Topology button below.
Show Topology
Show Done
CiscoTerminal
00:80:53: %SYS-5-CONFIG_I: Configured from console by console
lab_A#show interface serial 0
Serial0 is administratively down, line protocol is down
Internet address is 201.100.11.1/24
Hardware is HD64570
MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation HDLC, loopback not set
Keepalive set (10 sec)
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0 (size/max/drops); Total output drops: 0
Queueing strategy: weighted fair
Output queue: 0/1000/64/0 (size/max total/threshold/drops)
Conversations 0/0/256 (active/max active/max total)
Reserved Conversations 0/0 (allocated/max allocated)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
0 packets input, 0 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 1 interface resets
0 output buffer failures, 0 output buffers swapped out
EXIT
FEEDBACK
FAQ
Copyright © 2001 Cisco Systems, Inc.

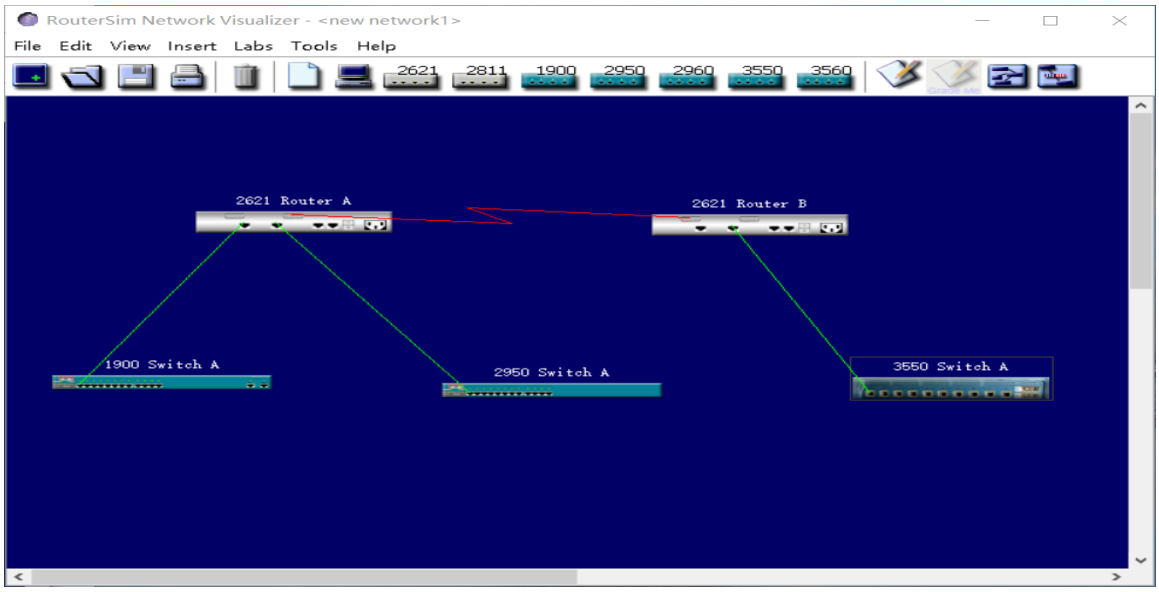
1.4

路由器 A 配置情况



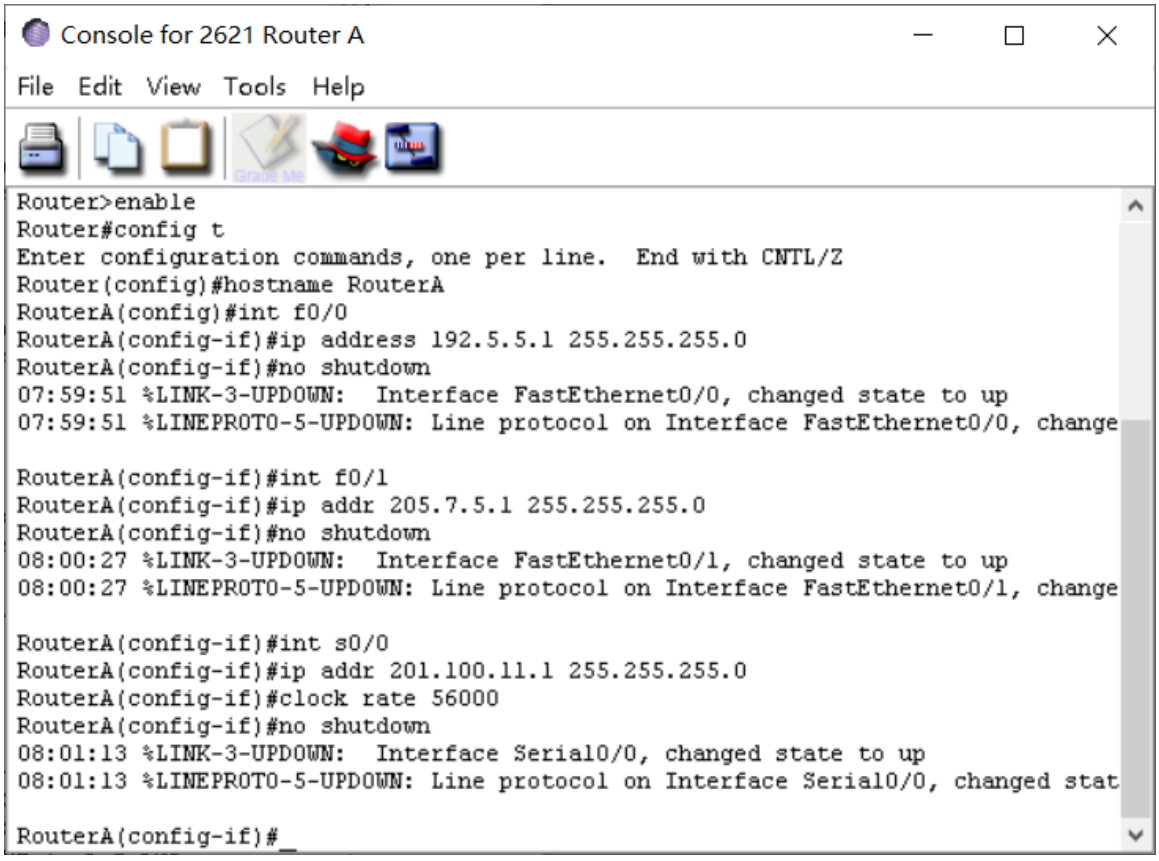
2.1

将实验设备在模拟器的设计界面上按拓扑图连接完成



2.2

配置路由器各个端口的 IP 地址，用 shutdown 命令激活端口，配置时钟频率



查看 RouterA 的路由表

```
RouterA#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR, P - periodic downloaded static route
       T - traffic engineered route

Gateway of last resort is not set
C     205.7.5.0/24 is directly connected, FastEthernet0/1
C     192.5.5.0/24 is directly connected, FastEthernet0/0
C     201.100.11.0/24 is directly connected, Serial0/0
RouterA#
```

配置 RouterB 各个端口 IP 地址，用 shutdown 激活

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z
Router(config)#hostname RouterB
RouterB(config)#int f0/0
RouterB(config-if)#ip address 199.6.13.1 255.255.255.0
RouterB(config-if)#no shutdown
07:54:34 %LINK-3-UPDOWN:  Interface FastEthernet0/0, changed state to up
07:54:34 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
```

```
RouterB(config-if)#int s0/1
RouterB(config-if)#ip addr 201.100.11.2 255.255.255.0
RouterB(config-if)#no shutdown
07:55:56 %LINK-3-UPDOWN:  Interface Serial0/1, changed state to up
07:55:56 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed state to up
```

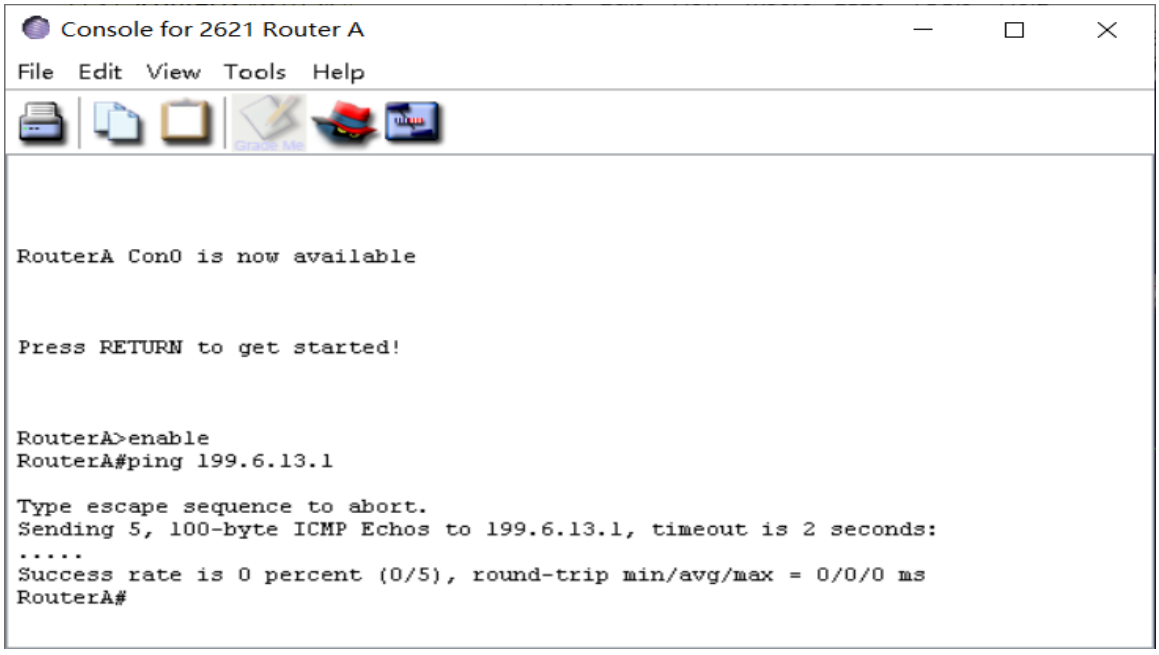
查看 RouterB 路由表

```
RouterB#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR, P - periodic downloaded static route
       T - traffic engineered route

Gateway of last resort is not set
C     199.6.13.0/24 is directly connected, FastEthernet0/0
C     201.100.11.0/24 is directly connected, Serial0/1
RouterB#
```

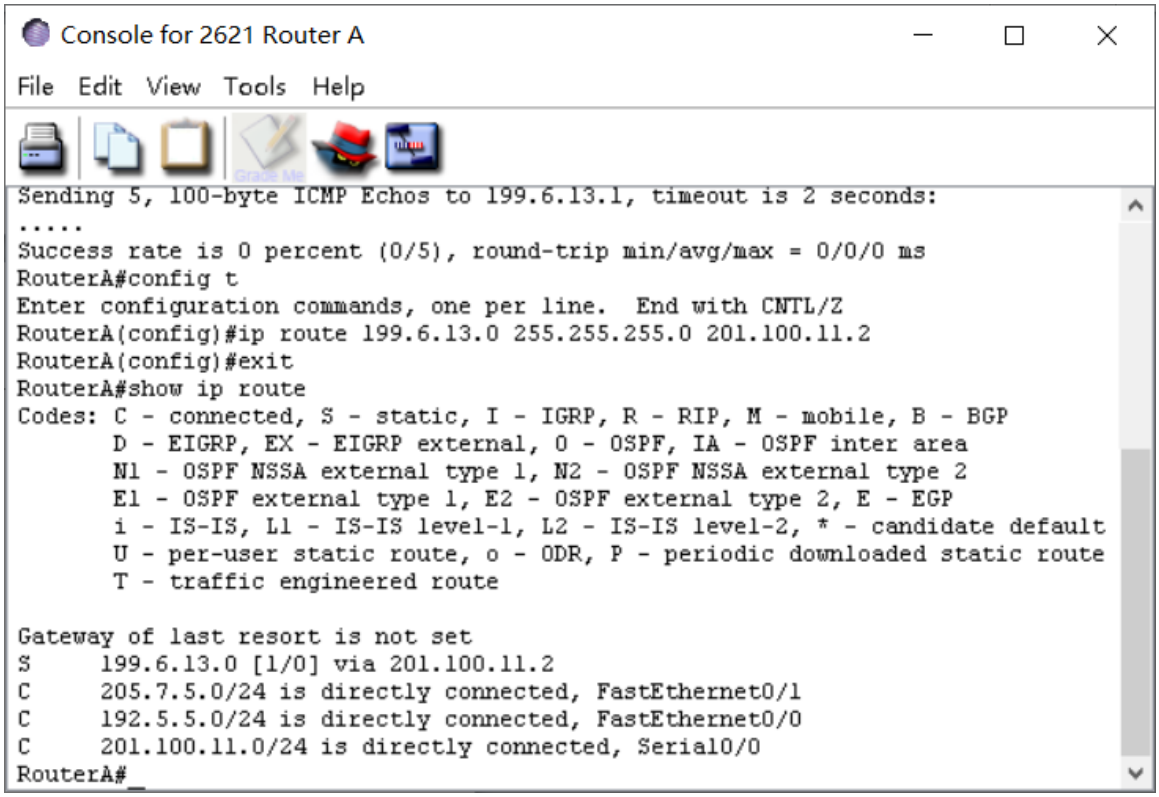
2.3

Ping 命令测试是否连通（不通）



2.4

配置静态路由



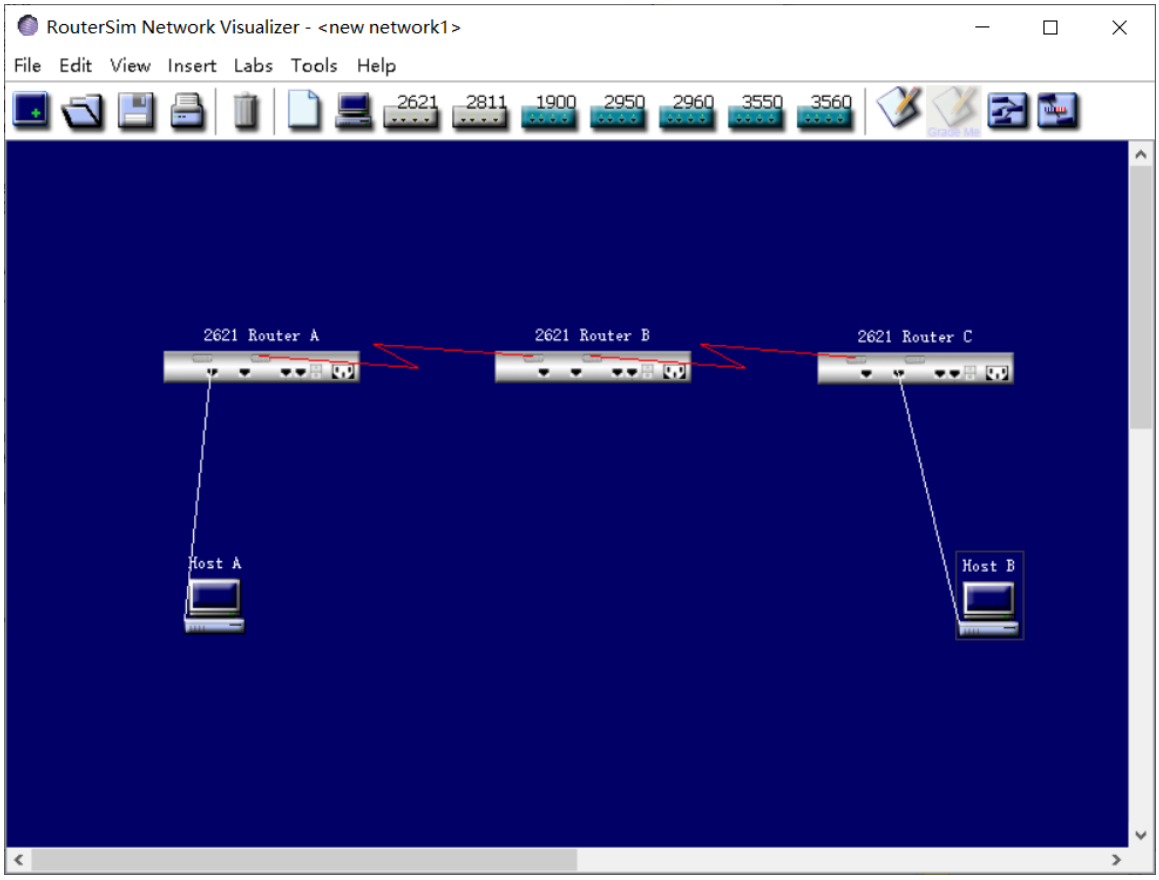
验证连通

```
RouterA#ping 199.6.13.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 199.6.13.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
RouterA#
```

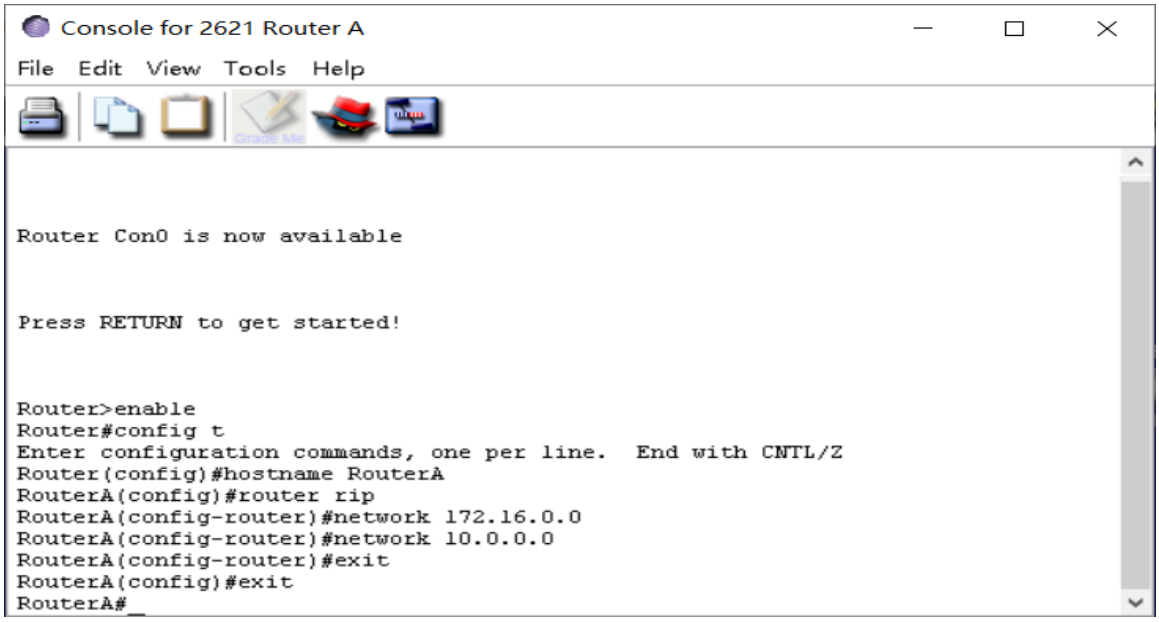
3.1

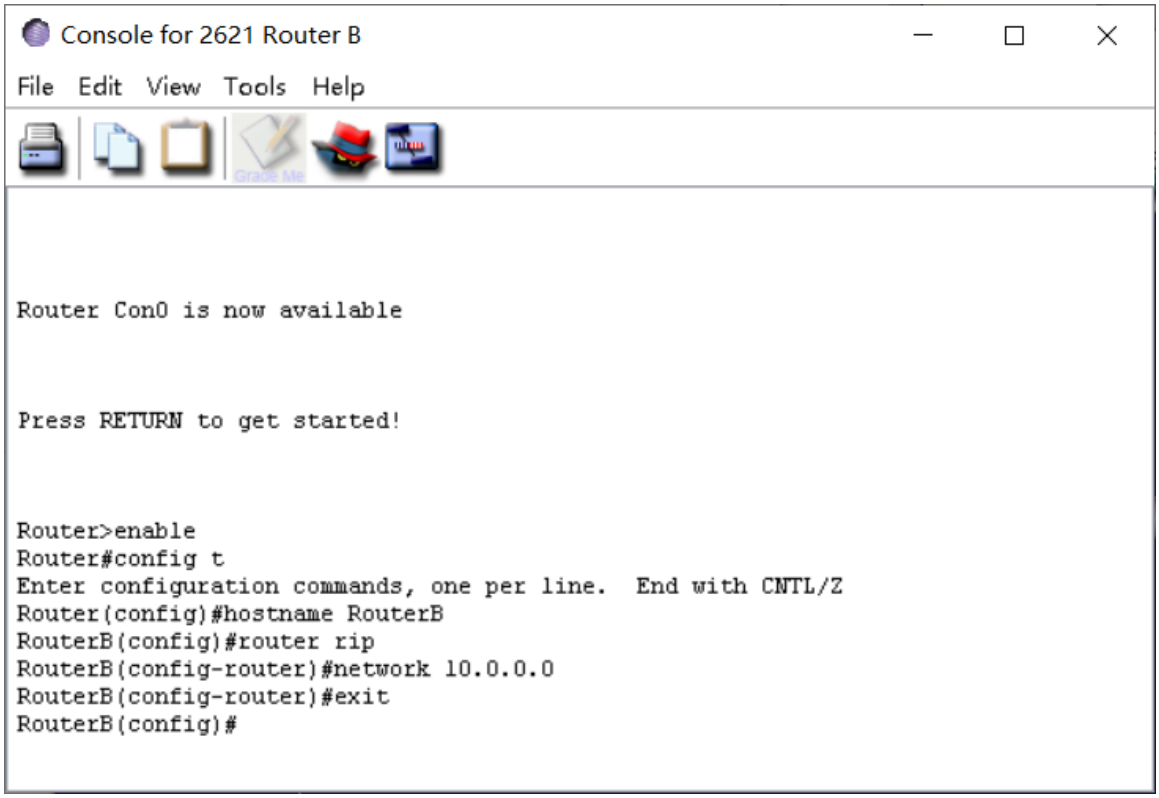
连接路由器和网络

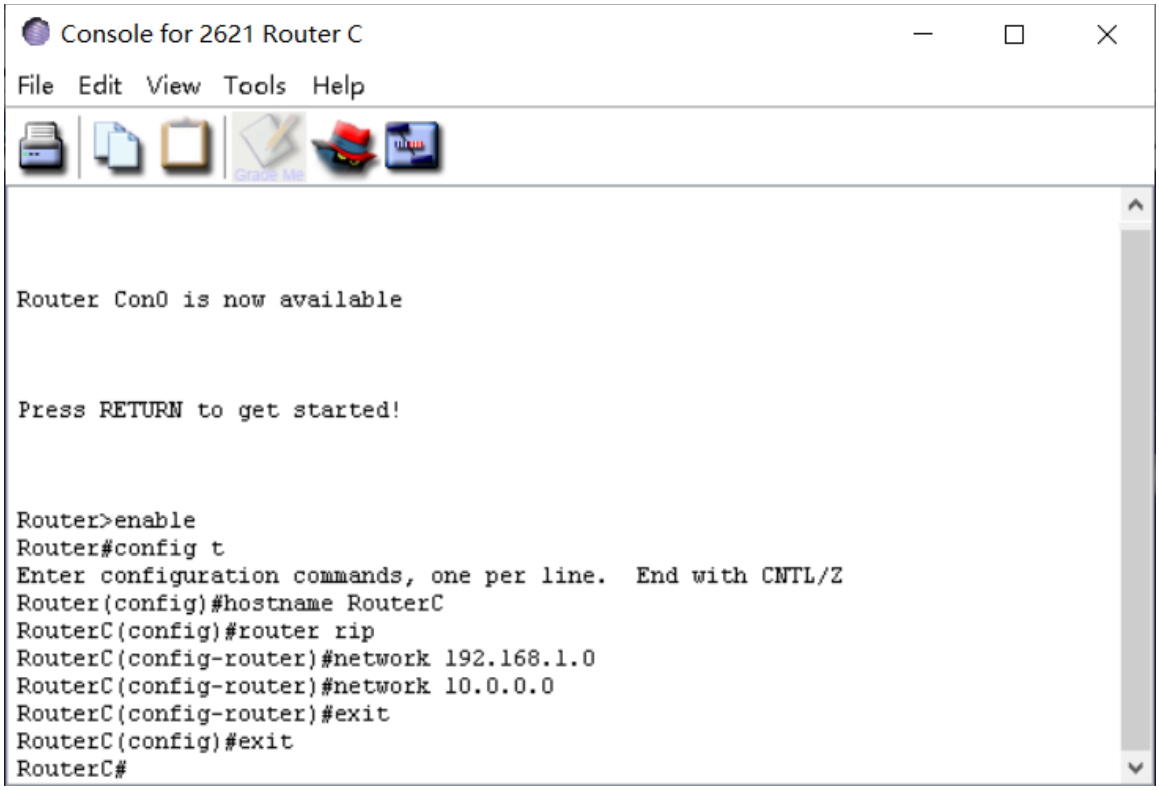

RouterSim Network Visualizer - <new network1>
File Edit View Insert Labs Tools Help
2621 Router A
2621 Router B
2621 Router C
Host A
Host B

3.2

配置 PIP

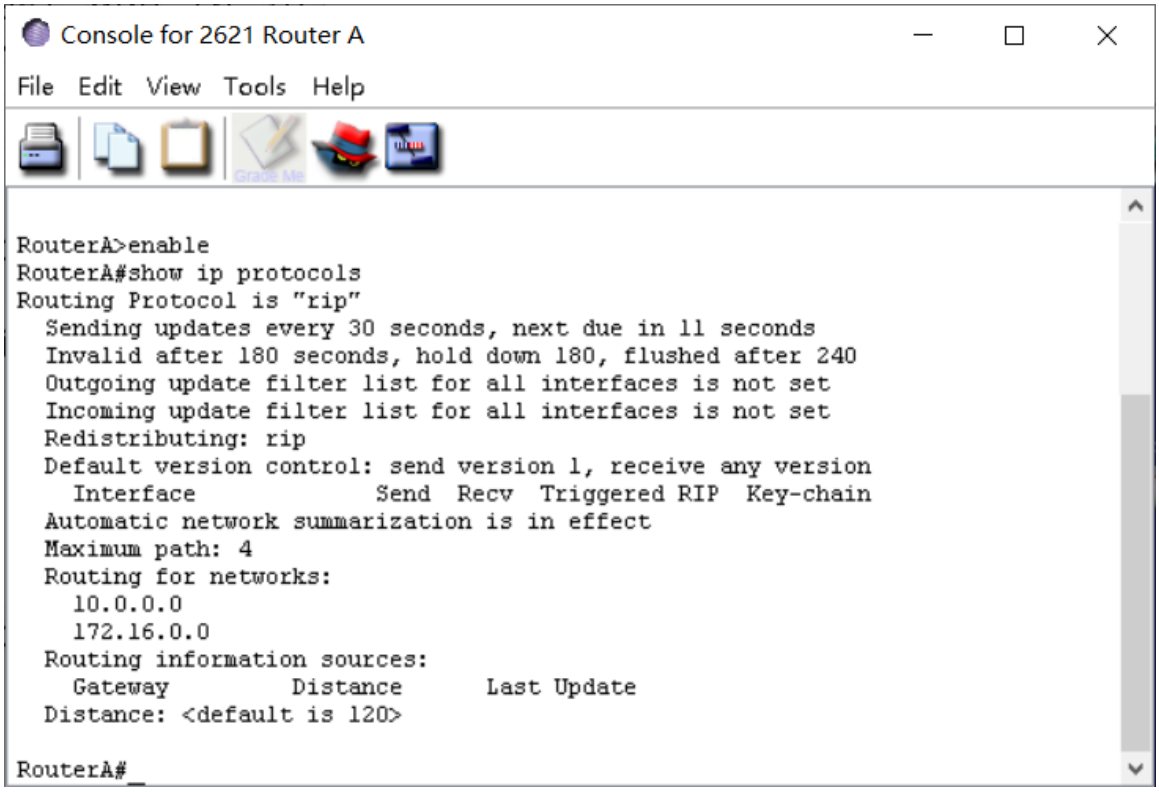

Console for 2621 Router A
File Edit View Tools Help
Router Con0 is now available
Press RETURN to get started!
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#hostname RouterA
RouterA(config)#router rip
RouterA(config-router)#network 172.16.0.0
RouterA(config-router)#network 10.0.0.0
RouterA(config-router)#exit
RouterA(config)#exit
RouterA#


Console for 2621 Router B
File Edit View Tools Help
Router Con0 is now available
Press RETURN to get started!
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#hostname RouterB
RouterB(config)#router rip
RouterB(config-router)#network 10.0.0.0
RouterB(config-router)#exit
RouterB(config)#

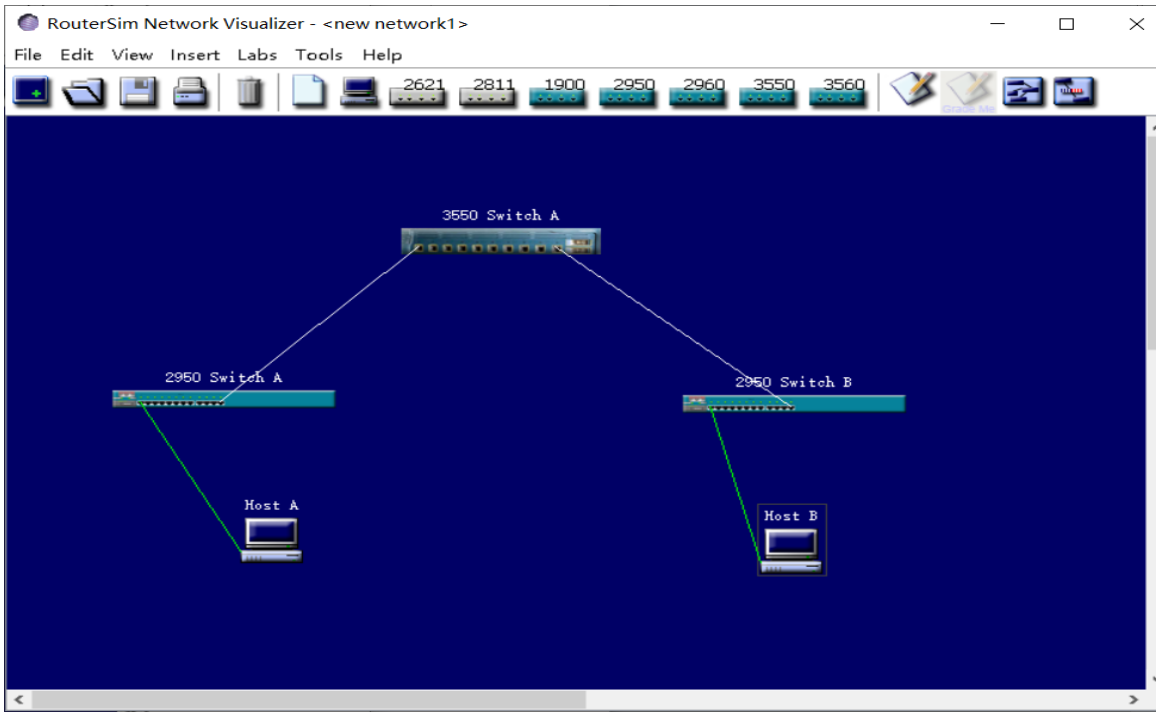

Console for 2621 Router C
File Edit View Tools Help
Router Con0 is now available
Press RETURN to get started!
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#hostname RouterC
RouterC(config)#router rip
RouterC(config-router)#network 192.168.1.0
RouterC(config-router)#network 10.0.0.0
RouterC(config-router)#exit
RouterC(config)#exit
RouterC#

3.3

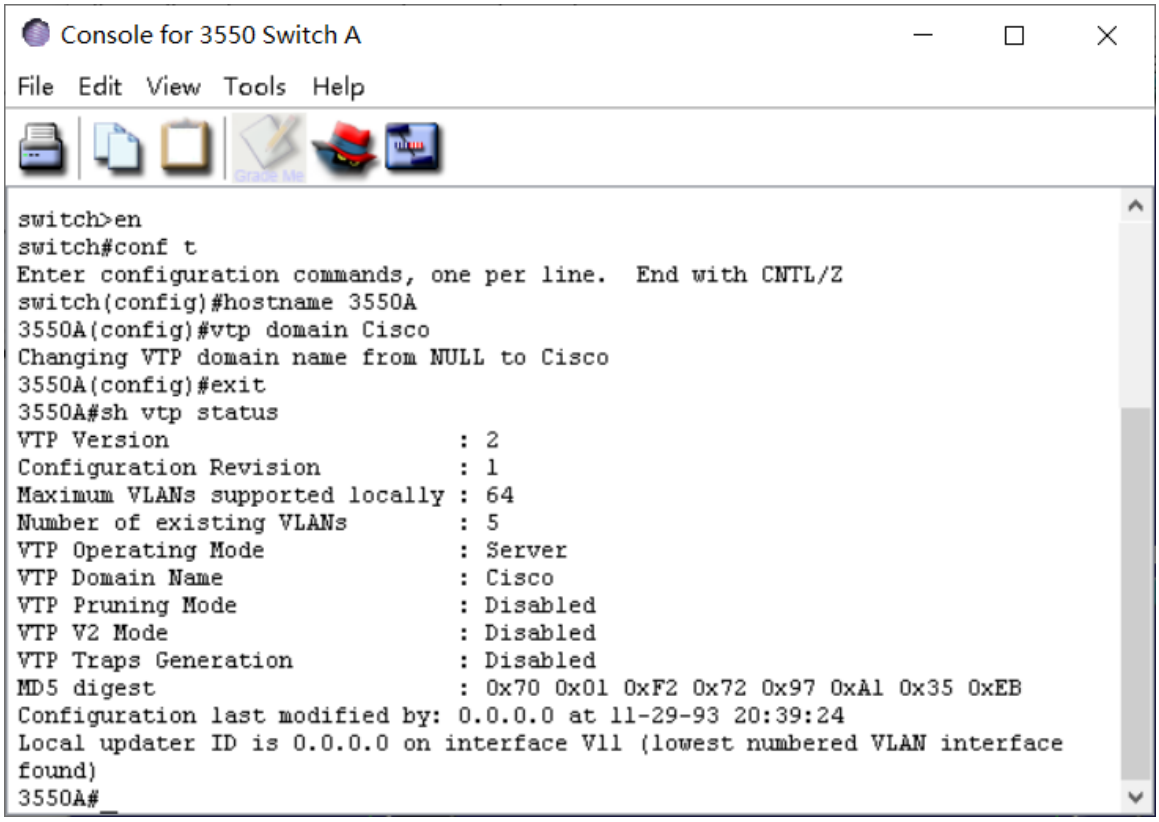
查看 RIP 协议的路由信息



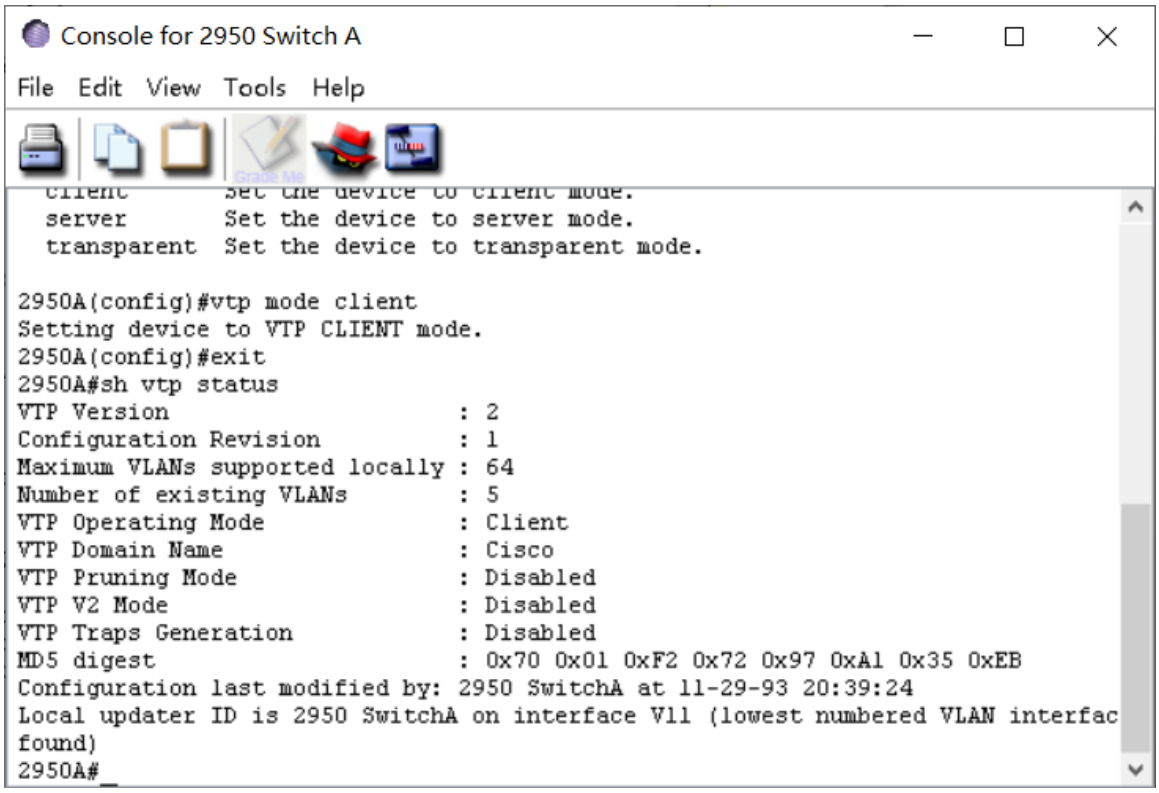
4 在一个典型的快速以太局域网中实现 VLAN 4.1 连接

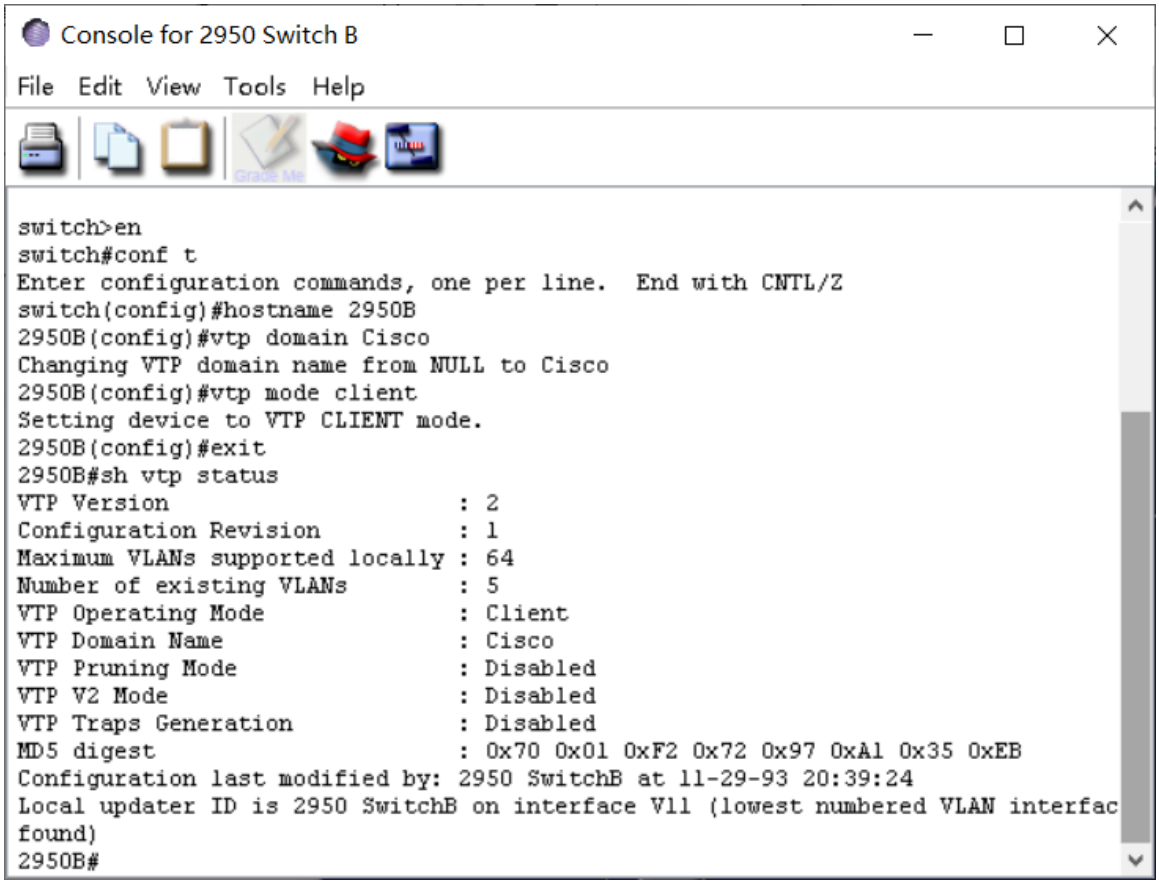


4.2 设置 VTP 域




```
switch>en
switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#hostname 2950A
2950A(config)#vtp domain Cisco
Changing VTP domain name from NULL to Cisco
2950A(config)#vtp mode ?
  client       Set the device to client mode.
  server       Set the device to server mode.
  transparent  Set the device to transparent mode.
```

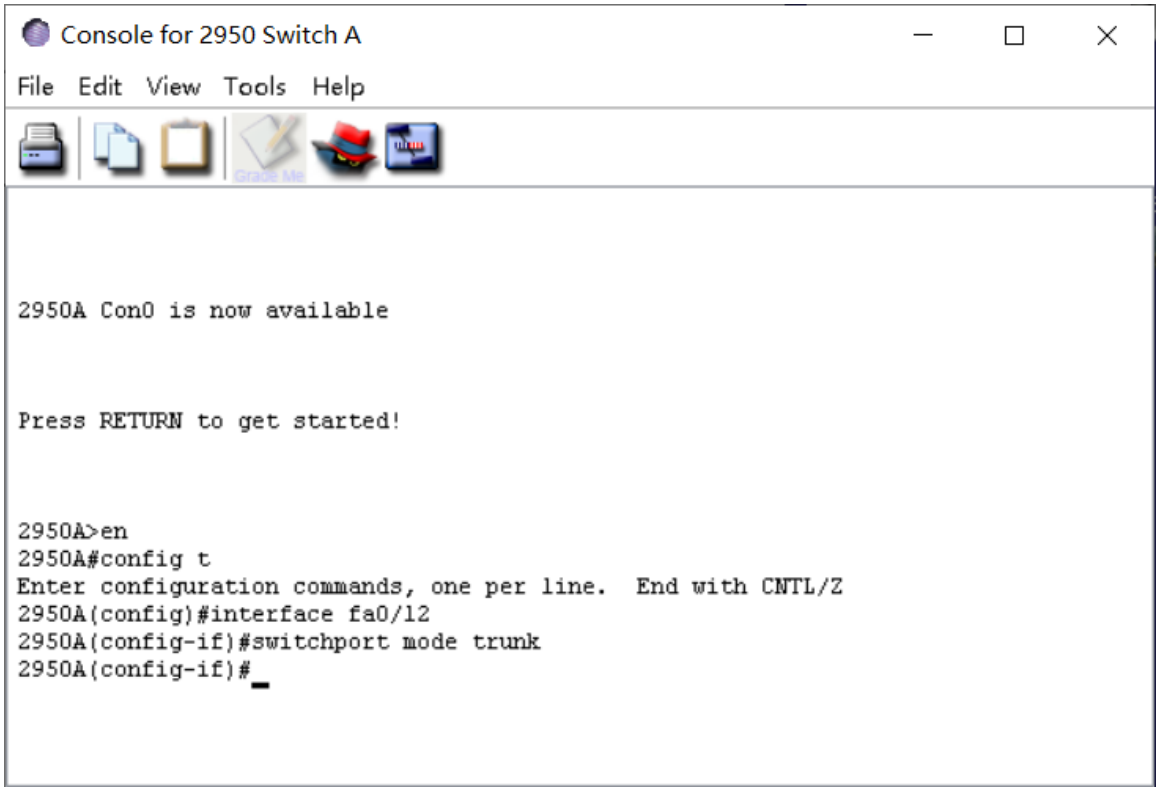

Console for 2950 Switch A
File Edit View Tools Help
client Set the device to client mode.
server Set the device to server mode.
transparent Set the device to transparent mode.
2950A(config)#vtp mode client
Setting device to VTP CLIENT mode.
2950A(config)#exit
2950A#sh vtp status
VTP Version : 2
Configuration Revision : 1
Maximum VLANs supported locally : 64
Number of existing VLANs : 5
VTP Operating Mode : Client
VTP Domain Name : Cisco
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0x70 0x01 0xF2 0x72 0x97 0xA1 0x35 0xEB
Configuration last modified by: 2950 SwitchA at 11-29-93 20:39:24
Local updater ID is 2950 SwitchA on interface Vl1 (lowest numbered VLAN interfac
found)
2950A#

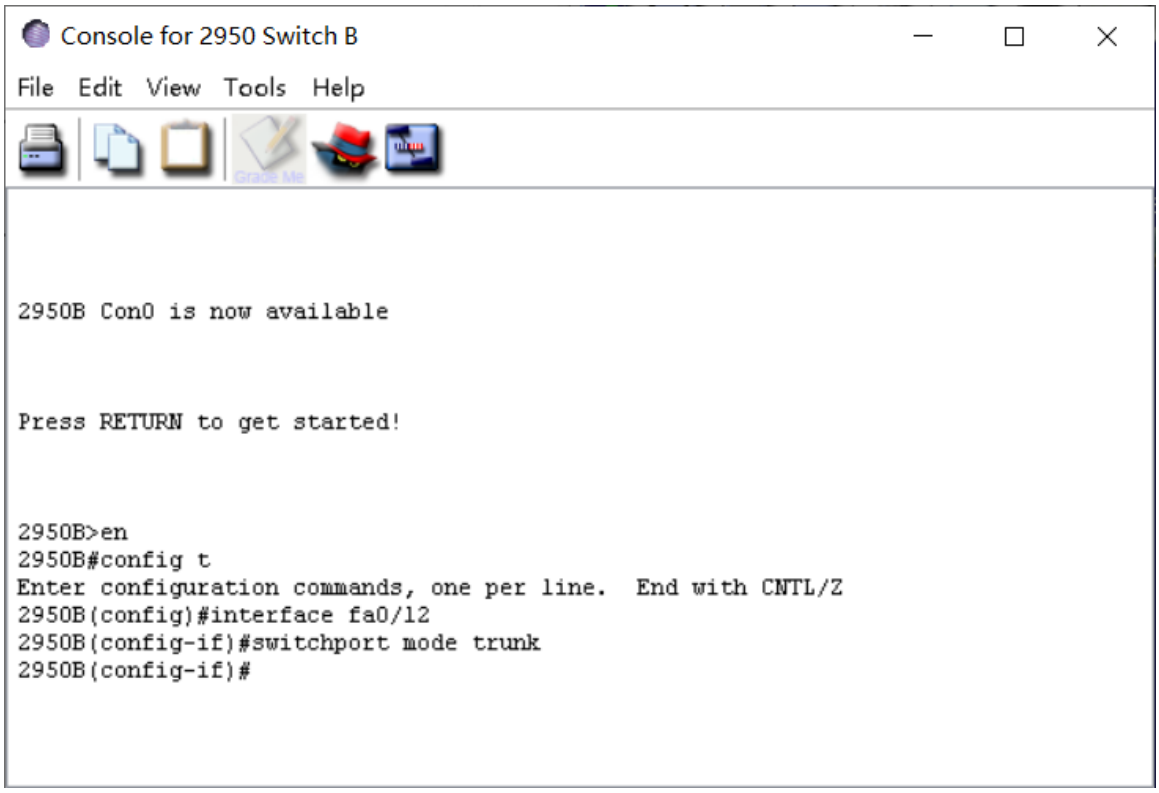

Console for 2950 Switch B
File Edit View Tools Help
switch>en
switch#conf t
Enter configuration commands, one per line. End with CNTL/Z
switch(config)#hostname 2950B
2950B(config)#vtp domain Cisco
Changing VTP domain name from NULL to Cisco
2950B(config)#vtp mode client
Setting device to VTP CLIENT mode.
2950B(config)#exit
2950B#sh vtp status
VTP Version : 2
Configuration Revision : 1
Maximum VLANs supported locally : 64
Number of existing VLANs : 5
VTP Operating Mode : Client
VTP Domain Name : Cisco
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0x70 0x01 0xF2 0x72 0x97 0xA1 0x35 0xEB
Configuration last modified by: 2950 SwitchB at 11-29-93 20:39:24
Local updater ID is 2950 SwitchB on interface Vl1 (lowest numbered VLAN interfac
found)
2950B#

4.3 配置 Trunk

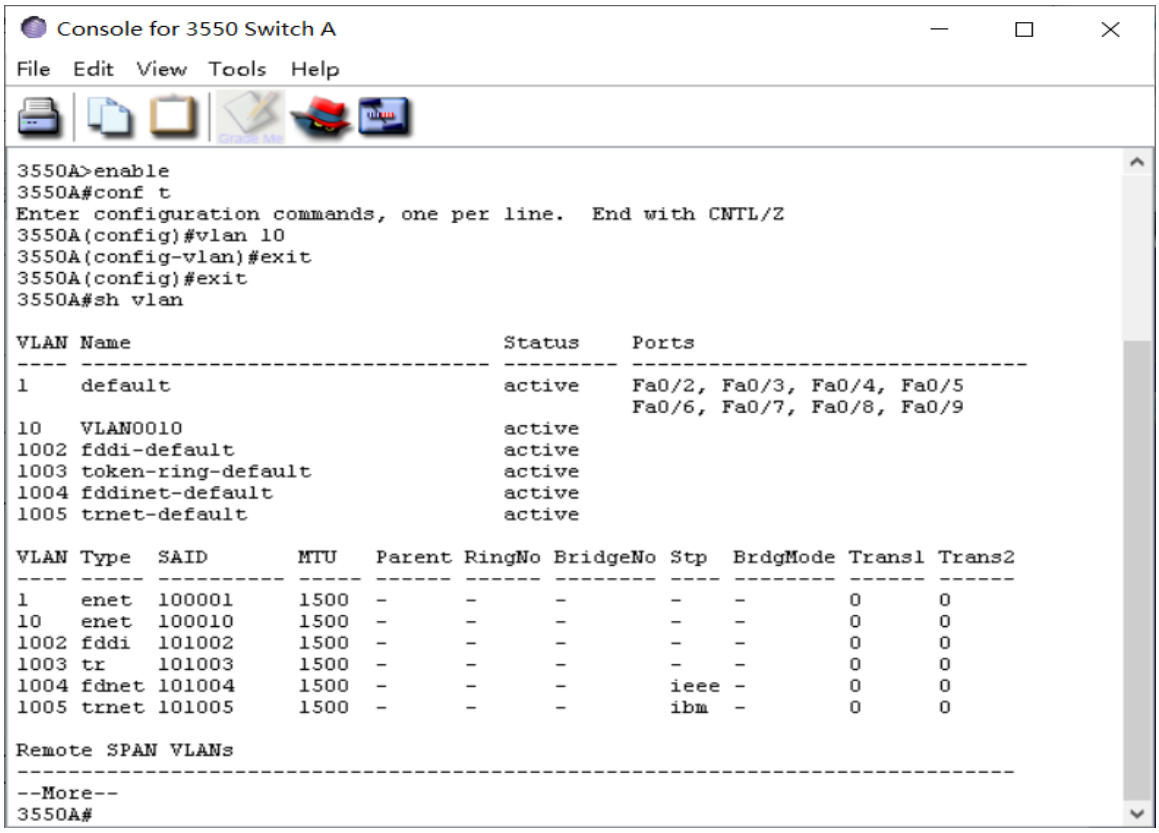
```
3550A>en
3550A#conf t
Enter configuration commands, one per line.  End with CNTL/Z
3550A(config)#interface fa0/1
3550A(config-if)#switchport trunk encapsulation ?
  dotlq      Interface uses only 802.1q trunking encapsulation when trunking
  isl        Interface uses only ISL trunking encapsulation when trunking
  negotiate  Device will negotiate trunking encapsulation with peer on
             interface
```

```
3550A(config-if)#switchport trunk encapsulation dotlq
09:36:17: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state
to down
09:36:17: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
3550A(config-if)#switchport mode trunk
3550A(config-if)#interface fa0/10
3550A(config-if)#switchport trunk encapsulation dotlq
09:38:31: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state
to down
09:38:31: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to up
3550A(config-if)#
```

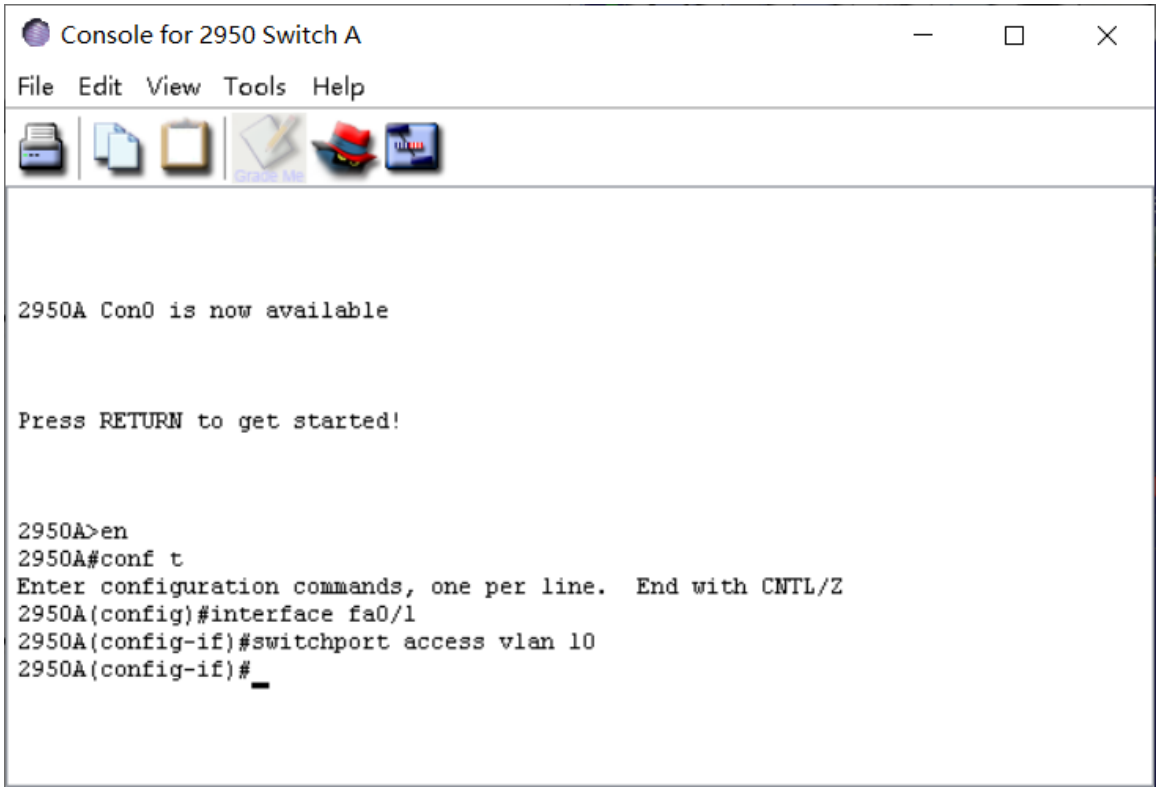


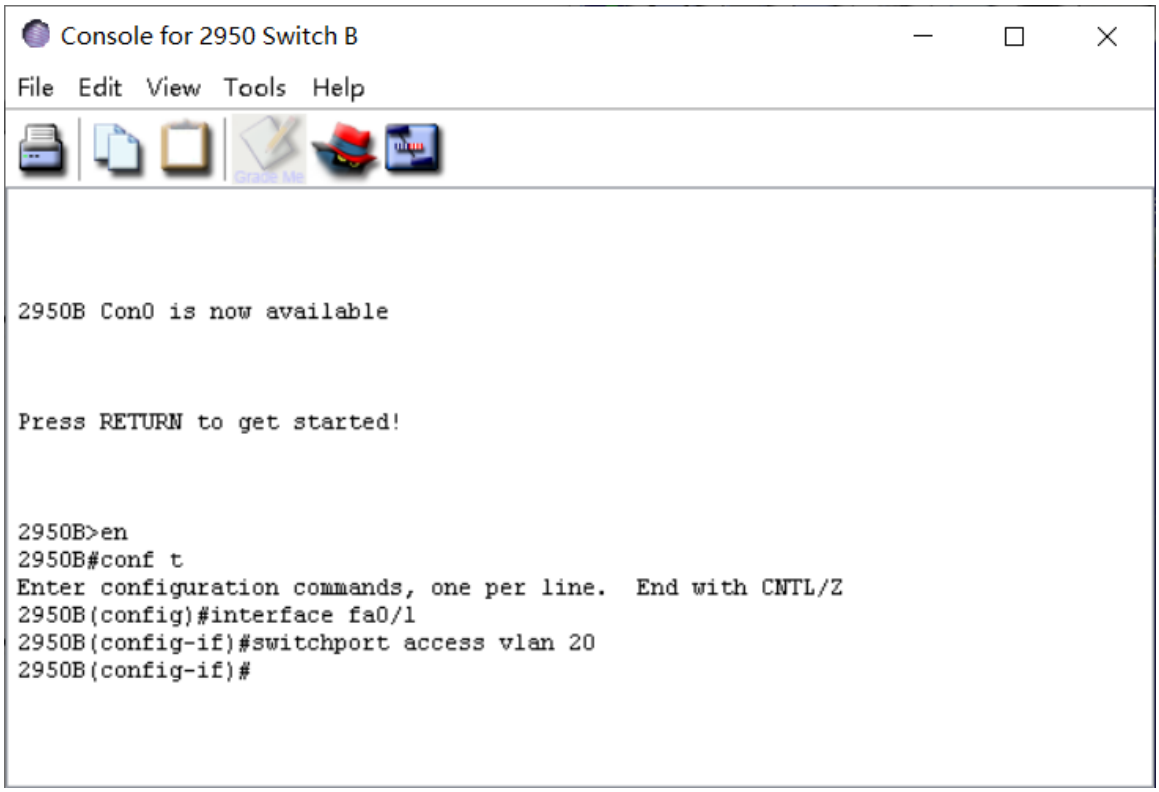

Console for 2950 Switch B
File Edit View Tools Help
2950B Con0 is now available
Press RETURN to get started!
2950B>en
2950B#config t
Enter configuration commands, one per line. End with CNTL/Z
2950B(config)#interface fa0/12
2950B(config-if)#switchport mode trunk
2950B(config-if)#

4.4 创建 VLAN

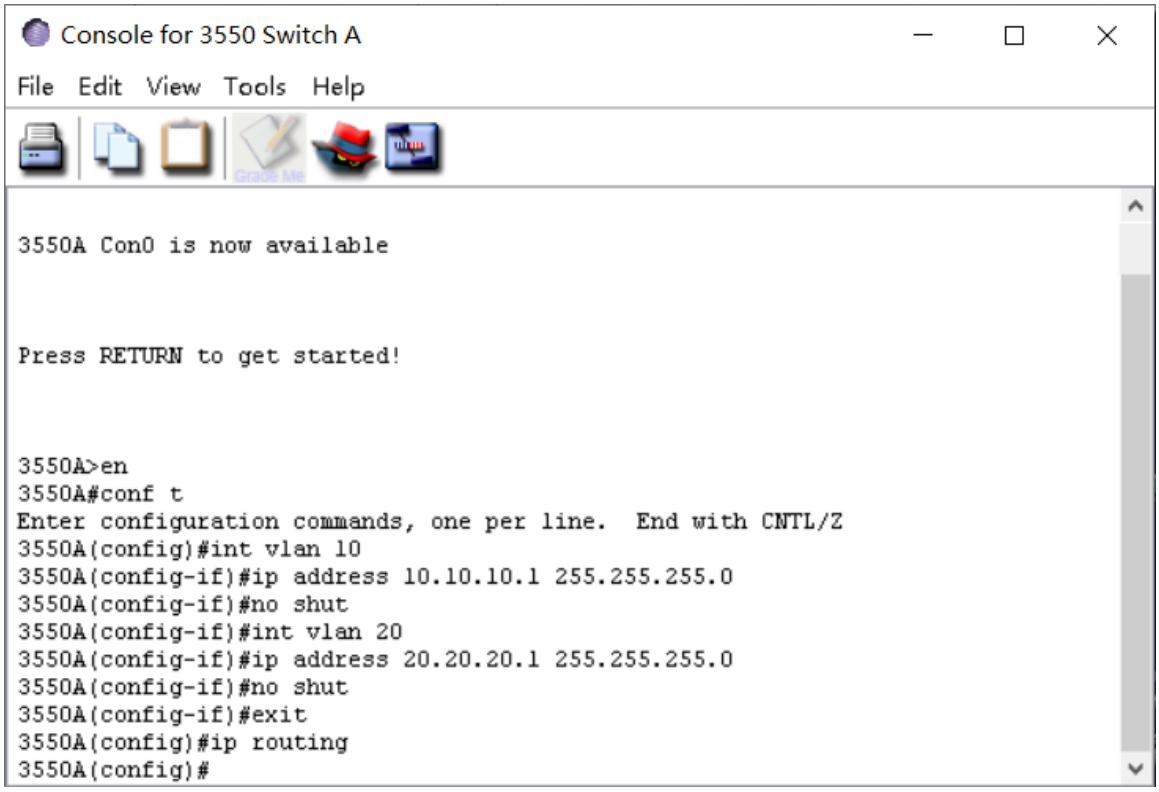

Console for 3550 Switch A
File Edit View Tools Help
3550A>enable
3550A#conf t
Enter configuration commands, one per line. End with CNTL/Z
3550A(config)#vlan 10
3550A(config-vlan)#exit
3550A(config)#exit
3550A#sh vlan
VLAN Name Status Ports
1 default active Fa0/2, Fa0/3, Fa0/4, Fa0/5
Fa0/6, Fa0/7, Fa0/8, Fa0/9
10 VLAN0010 active
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
1 enet 100001 1500 - - - - - 0 0
10 enet 100010 1500 - - - - - 0 0
1002 fddi 101002 1500 - - - - - 0 0
1003 tr 101003 1500 - - - - - 0 0
1004 fdnet 101004 1500 - - - ieee - 0 0
1005 trnet 101005 1500 - - - ibm - 0 0
Remote SPAN VLANs
--More--
3550A#

4.5 分配交换机端口加入 VLAN



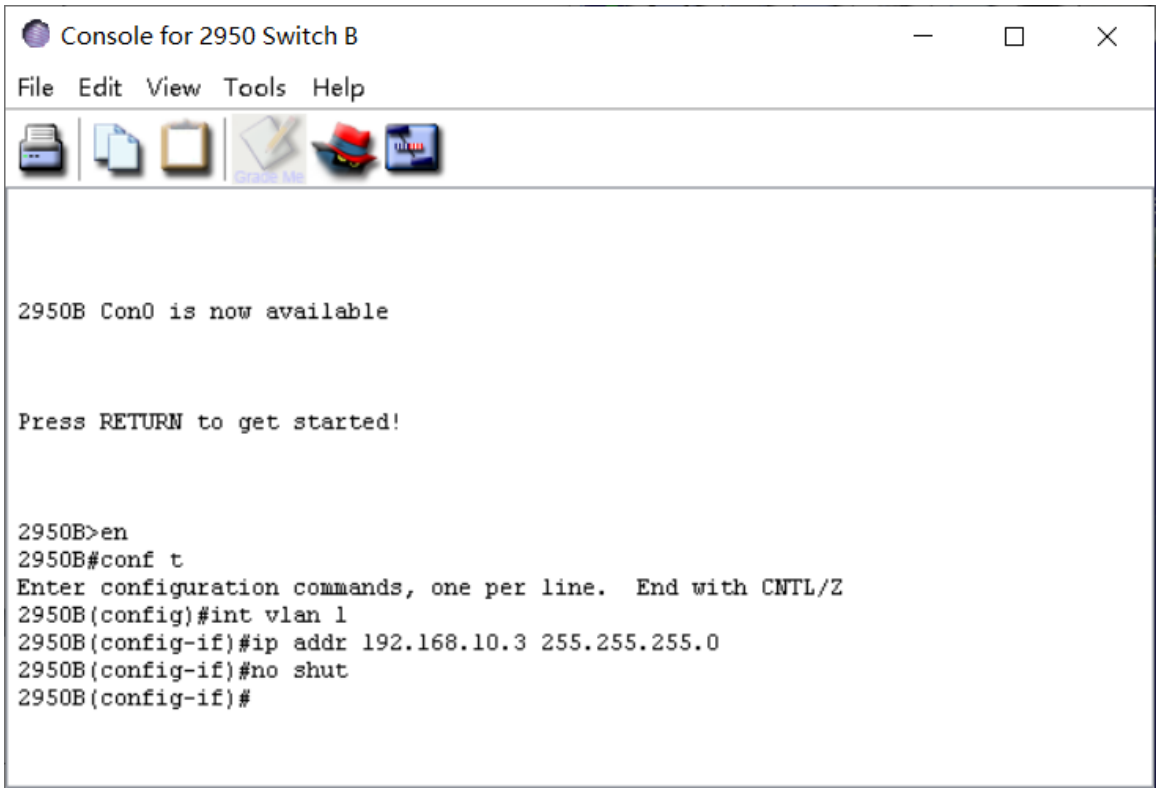


4.6 配置第三层交换机

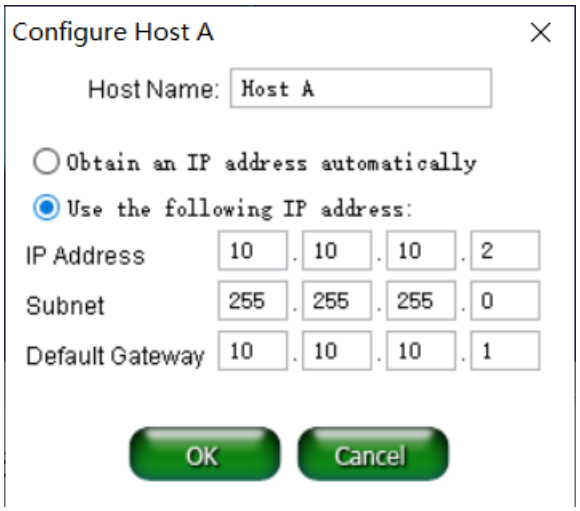


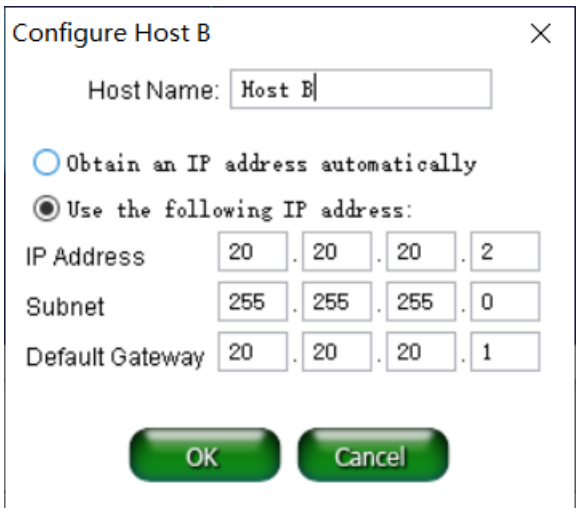
4.7 配置各交换机的管理地址

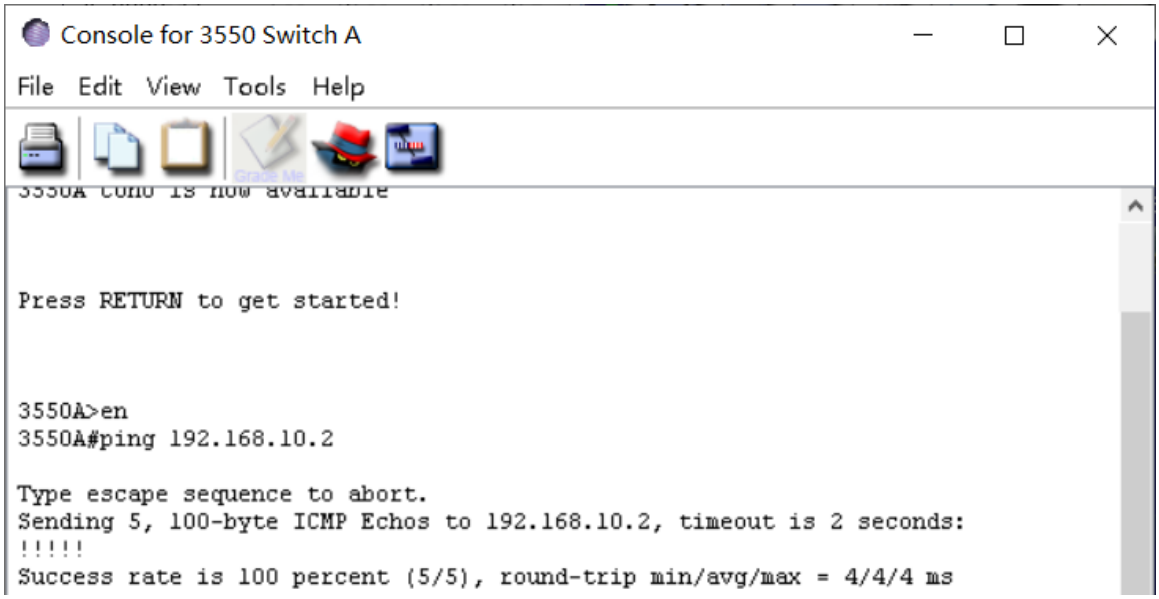
```
3550A(config)#int vlan 1
3550A(config-if)#ip addr 192.168.10.1 255.255.255.0
3550A(config-if)#no shut
3550A(config-if)#
```

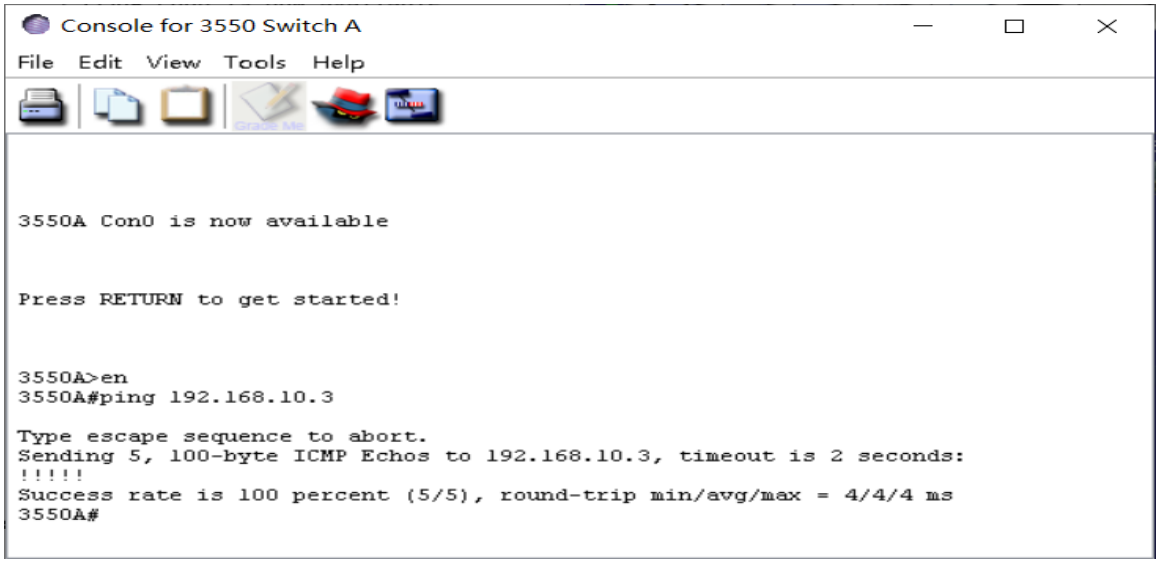


4.8 配置主机 Host A 和 Host B 并进行测试




Configure Host B
Host Name: Host B
Obtain an IP address automatically
Use the following IP address:
IP Address 20 . 20 . 20 . 2
Subnet 255 . 255 . 255 . 0
Default Gateway 20 . 20 . 20 . 1
OK
Cancel


Console for 3550 Switch A
File Edit View Tools Help
Press RETURN to get started!
3550A>en
3550A#ping 192.168.10.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms


Console for 3550 Switch A
File Edit View Tools Help
3550A Con0 is now available
Press RETURN to get started!
3550A>en
3550A#ping 192.168.10.3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
3550A#

4 实验总结

1. 学会使用模拟路由器软件来配置路由器，配置静态路由、动态路由和交换机端口的 VLAN；
2. 认识了路由器的工作原理和连接过程。